to separate the melting process from crosslinking or curing.

Powder coating materials known to date and curable with actinic radiation, which are said to meet these requirements, are based on polymers having readily polymerizable, generally acrylic or vinylic, double bonds.

The patents US-A-4,129,488 and US-A-4,163,810 describe UV-curable powder coating materials having specific spatial arrangements of olefinically unsaturated polymers. Here, the binder consists of an epoxy-polyester polymer in which the epoxy adduct is arranged spatially such that by means of a linear polymer chain it is at a distance from the polyester adduct. In addition, the polymer comprises a chemically bonded photoinitiator.

The European patents EP-A-0 650 978, EP-A-0 650 979, and EP-A-0 650 985 describe copolymers whose essential constituent is a relatively high fraction of methacrylate monomers. The copolymers may be used as binders for UV-curable powder coating materials, and feature a relatively narrow molecular weight distribution.

The European patent EP-A-0 410 242 discloses binders for UV-curable powder coating materials, consisting of polyurethanes having specific (meth)acryloyl groups. These polyurethanes may be crosslinked without crosslinking agents or peroxides, and are therefore stable on storage. Crosslinking by means of UV radiation, on the other hand, requires photoinitiators. The polyurethanes may also be used in a mixture with solid unsaturated polyesters.

Furthermore, the European patent EP-A-0 636 669 discloses UV-curable powder coating materials which comprise a mixture of unsaturated polymers (binder) and unsaturated crosslinking agents. Binders mentioned include, in particular, unsaturated polyesters and unsaturated polyacrylates, which may contain cyclopentadiene, and crosslinking agents mentioned include polyurethanes containing vinyl ether, vinyl ester or (meth)acryloyl groups.

These known UV-curable powder coating materials have problems which arise from the thermal sensitivity of the polymerizable double bonds that are used in them. This thermal sensitivity leads to a situation where, owing to the preparation, which is generally carried out in a solvent, to the removal of the solvent, and to the powder coating compounding which is carried out in

repeated melt processes, there is a loss of reactivity and a partial crosslinking.

The removal of the solvent in particular is critical since on the one hand even small fractions of residual solvent considerably impair the blocking resistance of the powders while, on the other hand, energetic thermal drying methods frequently result in premature thermal crosslinking of the double bonds. Accordingly, the European patent EP-A-0 585 742, for example, proposes subjecting an acrylically unsaturated polyurethane which is synthesized in a solvent to strong dilution with acetone, then precipitating it with a large amount of water and drying it at room temperature; this, however, is a disproportionately complex process which, moreover, produces a large fraction of waste products.

Furthermore, the known unsaturated binders have a marked crosslinking activity even in the solid state, e.g., as compounded UV powder coating materials, under ambient light conditions, and so can only be handled under filtered light.

It is an object of the present invention to provide stable coating materials, especially powder coating materials, which are of low viscosity at melt temperature and yet have a high reactivity on exposure